

THE SYSTEMATIC POSITION OF *PURPURA TRITONIFORMIS* OF BLAINVILLE.

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(Plate xxix.)

A good deal of doubt has existed as to the systematic position of the mollusc under discussion. It was first described as a *Purpura* by Blainville.* Kiener† placed it in the same genus in his second section *Semi-ricinules*. Dunker‡ described it as *Adamsia typica*, classing it with *Cominella*. Tenison-Woods§ subsequently showed that *Adamsia* was preoccupied by Prof. E. Forbes, and replaced it by *Agnewia*. Tryon|| who next dealt with it, transferred the species to *Urosalpinx* on the strength of its purpuroid operculum. His synonymy of it embraced *Adamsia typica*, Dkr., *A. adalaidæ*, Ad. & Ang., and *Purpura neglecta*, Angas, the last two as possible varieties. No one acquainted with *P. neglecta* in Sydney Harbour would agree that it conforms either generically or specifically with *P. tritoniformis*. The validity of *A. adalaidæ* is maintained by Dr. Verco.¶

Watson,** practically ignoring Woods's correction, re-instated *Adamsia* as a subgenus of *Cominella*. The operculum, which Angas†† had previously stated to be purpuroid, he considered evidence for, rather than against, this classification. The species is omitted from the *Conchologica Iconica*, the *Conchlyien Cabinet*, and the *Thesaurus Conchylorum*.

* Nouv. Ann. du Mus. d'Hist. Nat. Tome i. p. 221, pl. 10, fig. 10, 1833.

† Coq. Viv. Purpurifère, i., pl. 8, fig. 18.

‡ Proc. Zool. Soc. 1856.

§ Proc. Roy. Soc. Tasmania for 1877.

|| Man. Conch. Vol. ii., 1880, p. 156.

¶ Trans. Roy. Soc. S. Aust., 1895, Vol. xix., p. 101.

** Chall. Rep. Zool. Vol. xv., Gasteropoda, 1885, p. 214.

†† Proc. Zool. Soc. 1867, p. 192.

After a careful study of the shell, its apex, the operculum, and the mollusc itself, I have come to the conclusion that its right place is in the genus *Purpura*, where it was first assigned.

There are three varieties of the shell: firstly, the typical; secondly, a stouter form confined to Lord Howe Island; thirdly, a lighter form.

The form selected as typical is of course that figured by Blainville. Kiener's illustration seems a copy (too highly coloured) of Blainville's. This aspect of the species is the commonest on the coast of New South Wales; it also occurs at Lord Howe Island.

P. TRITONIFORMIS, var. *SMITHI*, Brazier.

Purpura Smithi, Braz., Aust. Mus. Mem. No. ii. Lord Howe Island, p. 28, pl. ii., figs. 1-4, 7-12, 21, 22.

Heavier, shorter and stouter than the type; spire shorter. Sculpture: body whorl—spirals coarser than in the type, being raised into stout cord-like ribs; longitudinals, consisting of coarse hair lines, most prominent between the ribs, making the interstices scabrous: spire—spiral ribs ornamented with nodules, as broad as their interstices, in transverse oblique rows; the longitudinal scabrous hair-lines gathered together between these nodules to form riblets which tend to give the spire a latticed appearance. Aperture smaller than in the type, the revolving liræ within more prominent. Length 17-25, breadth 6-14 mm.

This variety seems to be confined to Lord Howe Island.

The name was given to it by Brazier in 1889, without a description, and the figures of it then published were unfortunately reversed in the press.

P. TRITONIFORMIS, var. *LEVIDENSIS*, var. nov.

Lighter than the type, but of the same outline. Sculpture—spirals consisting of a multitude of fine lines overlying four or five obsolescent broad low rounded ribs; longitudinals, eleven to fifteen low rounded ribs slightly broader than their interstices traverse the whorls, between which and the revolving ribs may be seen the longitudinal scabrous hair-lines. Aperture rounder

and larger than in the type, due to the absence of a porcellaneous thickening on the interior of the outer lip. The revolving liræ in the aperture are finer, more numerous, and stained dark brown. Proportions as in the type.

· *Hab.*—New South Wales and Lord Howe Island.

Type to be presented to the Australian Museum.

The purpuroid characters of the adult shell are in the aperture. The columellar area is broad and flattened, and the thickened and lirate outer lip is decidedly characteristic of the genus *Purpura*. The sculpture of var. *smithi* is not unlike (in miniature) that of *P. succincta*, Martyn.

Several apices of the same type as that of *P. tritoniformis* have been treated as adult mollusca, and as their history bears directly on the conclusions I have arrived at, I give the following résumé of it.

The first of these was described by Gray* as *Struthiolaria microscopica*. The second is that described by D'Orbigny† as *Sinusigera cancellata*. The third is *Cheletropis huxleyi* of Forbes.‡ Others were meagrely described by A. Adams in various papers in the Annals and Magazine of Natural History, and others again by Craven§ in his Monograph of the genus *Sinusigera*. The principal conchological feature of the three mentioned was the possession of claw-like lobes on the outer lip, such as are so plainly shown by my fig. 4.

Dr. J. D. Macdonald|| pointed out the anatomical similarity of *Sinusigera* (*Cheletropis*) *huxleyi* to *Macgillivrayia pelagica*, Forbes (*loc. cit.* p. 383), another pelagic gasteropod embryo; and, being under the impression that they were adult molluscs, suggested that they should be placed in an order by themselves. A. Adams¶ wrote that the genus *Sinusigera* belonged to the *Macgillivrayiæ*,

* Zool. Voy. Blossom, 1839, p. 108.

† Hist. Pol. y Nat. de Cuba, 1846, Moll. Vol. v., p. 241.

‡ Voy. Rattlesnake, 1852, Vol. ii. Append. 385, pl. iii., figs. 9 a and b.

§ Ann. Soc. Mal. Belgique, 1877, Vol. xii.

|| Phil. Trans. 1854, Vol. 145, pp. 289-297.

¶ Ann. Mag. Nat. Hist., June, 1857, p. 461.

and proposed the suborder *Brachiocephala* for the reception of the family. In the first volume of their "Genera of Recent Mollusca" (p. 60, 1853), the brothers Adams placed the genus *Sinusigera* among the Pteropoda, but in the second volume (1858, p. 613) as a result of Dr. Macdonald's article they placed it among the Heteropoda in their family *Macgillivrayidae*.

The first to realise that *Sinusigera* was an embryonic and not an adult mollusc was Dr. J. D. Macdonald,* in 1858, and he gave his reasons for supposing one he had found to be the pullus of a Pedicularia.

As the apex of the Pedicularia he figured shows at least two smooth and three cancellated whorls, and the pullus shows only one cancellated whorl, and as there is also a difference of contour, we may be allowed to doubt the correctness of his conclusions till further proof is forthcoming. Dautzenberg† figures the apex of a Pedicularia, but he does not mention any *Sinusigera*-characters. Further, it might be well to notice that Macdonald's pullus, which is very similar to the one I figure, came from about the same locality.

This note of Macdonald's, although it sowed the seeds of doubt, did not settle the matter conclusively, for A. Adams described several subsequent to its appearance, and Craven's monograph, in which he described new species, was published in 1877. The latter considered the constancy of shape and size of each species proof of the stability of the genus.

Jousseume,‡ in a "Note sur le développement des coquilles," says that Mons. Calamle, of Benguela, had found that the embryonic whorls of *P. hæmastoma*, Linn., show all the characters of a *Sinusigera*. Craven§ figures a young stage in the growth of a *Purpura* showing the *Sinusigera*-character of the pullus; this he believes is *P. hæmastoma*, and remarks that the pullus is very similar to *S. cancellata*, D'Orb. Crosse|| republished his figures,

* Trans. Linn. Soc. Lond. Vol. xxii. p. 241.

† Result. Camp. Scien. de Prince de Monaco. Fasc. i., pl. iv., figs. 2a-2b.

‡ Le Naturaliste, 1882, p. 183.

§ Ann. Mag. Nat. Hist. 1883, p. 141.

|| Journ. de Conch. 1885, p. 161, pl. ix., fig. 5.

and confirmed his conclusions. Dautzenberg also figured a young stage of *P. hæmastoma* showing the same characters.* This figure was copied by Simroth in Bronn's Klass. u. Ord. (Band iii., 1899, taf. xxi., fig. 9).

According to Tryon (*loc. cit.*, p. 52), A. Adams has referred a *Sinusigera* to *P. biserialis*, Blainv.

Figure 1 of Plate xxix., shows the *Sinusigera*-character of the apex of *P. succincta*, Martyn. Figures 2-3 represent different stages in the early growth of *P. tritoniformis*, and show plainly that this species also has an apex of the *Sinusigera*-type. That *P. tritoniformis* has an apex of this type was first noticed by Mr. A. U. Henn (Proc. Linn. Soc. N.S.W. (2) Vol. ix. 1894, p. 167)

Figure 4 represents a detached pullus of this type obtained in the towing-net 360 miles north-east of Sydney; a similar pullus was dredged by Brazier in Vacluse Bay, Port Jackson. This may be the embryo of *P. tritoniformis*, but so great is the resemblance between the apex of that species and that of *P. succincta* that at present it is impossible to tell to which species the specimen figured belongs. It is probable that in the embryonic stage they are exactly similar. The little shell answers well to Forbes' description and figure of *Cheletropis huxleyi*, but in view of the similarity mentioned above I refrain from saying definitely that it is that species.

We cannot yet decide on the value of the apex for classificatory purposes, but since the only three embryos of this extraordinary type that have been followed to their later stages have proved to be those of *Purpura*, such an apex may surely be taken as a guide to the generic position.

It has occurred to me that the tooth of *Monoceras* may possibly be a perpetuation of the lower *Sinusigera*-lobe. It would be interesting to know whether the species of that genus have an apex of the type.

I do not expect the embryo of every *Purpura* to be of the *Sinusigera*-type, but every embryo of the type to be that of a *Purpura*.

* *Loc. cit.*, p. 38, pl. ii., fig. 5.

By "Sinusigera-type" I mean an embryo bearing on its outer lip the claw-like processes and consequent sinus so noticeable in all the examples mentioned. I know that Dall* has proposed the name *Sinusigera* for cancellated apices of the *Pleurotomidæ*; but with all deference to one so much my senior I would suggest that the term were better restricted to such as I mention above.

The operculum, as Angas said, is purpuroid; the nucleus is placed in the middle of the outer edge. The inner surface is finely striated.

The mollusc itself so closely resembles *P. succincta* that but for the lingual ribbon it would be almost impossible for the dissector to tell whether he were working on the young of that species or an adult *P. tritoniformis*. The two dentitions are represented in figs. 5-6 of Plate xxix. It will be observed that the difference between these two radulæ is one of degree rather than of kind.

Summary.—In the preceding pages reasons are given for removing *P. tritoniformis* from *Urosalpinx* and *Cominella* and transferring it to *Purpura*. It remains to select a subgenus of the latter for its reception. By the form of the shell *Polytrope* might claim it, but the resemblance of the larval shell and of anatomical characters to *P. succincta* is so close that *Trochia* would seem more appropriate.

The names *Adamsia* and *Agnewia* consequently lapse into the synonymy of *Trochia*.

EXPLANATION OF PLATE XXIX.

- Fig. 1.—Young of *Purpura succincta*, Martyn; length 2·3 mm.
 Fig. 2.—Young of *Purpura tritoniformis*, Blainv.; length 3 mm.
 Fig. 3.— " " " " " 5 "
 Fig. 4.—An embryo of the Sinusigera-type; length 2, breadth 1·3 mm.
 Fig. 5.—Dentition of *Purpura tritoniformis*.
 Fig. 6.— " " *succincta*.
 Fig. 7.—Operculum of *Purpura tritoniformis* (adult); 10·5 × 6·5 mm.
 Fig. 8.—Operculum of *Purpura succincta* (young); 18·12 mm.

* Blake Moll. Vol. ii., p. 124.